-40 to +60°C

Technical Specifications

MOBOTIX M16 B Thermal
M16B Thermal TR

MX**///**6

Twice As Secure. Even In Total Darkness.
The intelligent video system with an integrated high-performance thermal image sensor takes full advantage of the M16B camera design. Thanks to the two directly adjacent lenses, there is also a thermal overlay function with image overlay (thermal and optical) to pinpoint the exact location of hotspots like smoldering fires in a visible image. The MOBOTIX TR cameras feature a calibrated thermal image sensor. Thermal radiation measurements made across the entire image area can be used to trigger an event based on the temperature increasing above or decreasing below an individually set trigger level (camera alarm, network message, activation of a signal output etc.).

- ■ Mx6 system platform 2nd generation, with MxBus, H.264 and ONVIF compatibility

- ■ Fixed premium thermal image sensor with an NETD of 50 mK

- ■ Thermal Radiometry For measurable added value: calibrated thermal image sensor

- ■ Thermal field of view: 45°, 42°, 35°, 25° or 17°

- ■ Additional image sensor module options

- ■ Recording on an internal MicroSD card (4GB as standard)

- ■ Integrated microphone and speaker

- ■ MxActivitySensor can also be used in total darkness

- ■ PoE thermal camera with a power consumption of < 10 W
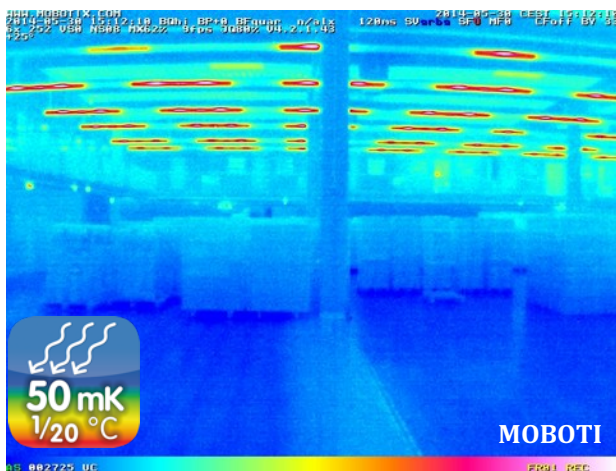
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General Product Information

Basic Information On Thermal Imaging Technology

Thermal imaging technology is a contactless imaging procedure that makes it possible to see the thermal radiation from an object or body otherwise invisible to the human eye (mid-wavelength infrared). Thermal radiation is electromagnetic radiation emitted by a body based on its temperature. It is caused by thermal motion within a body's molecules. This is the result of accelerated charges that emit radiation in accordance with the laws of electrodynamics. Thermal imaging technology captures and displays temperature distribution across surfaces and objects. Thermographic cameras usually display heat intensity information in artificial colors (blue = cooler, red = warmer). In terms of the number of pixels, the resolution is considerably lower than that for cameras capturing the visible spectral range.
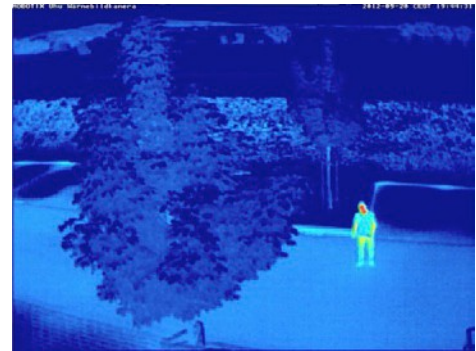
Unlike cameras with optical image sensors, one of the decisive quality criteria for a thermal camera is the camera's ability to capture the slightest differences in temperature and to produce an image that displays these differences in colors. The NETD, or Noise Equivalent Temperature Difference, is used to measure the sensitivity of a thermal sensor and is expressed in millikelvin. With an NETD of 50 mK, MOBOTIX thermal cameras can visualize temperature variations starting at 0.05°C , which places them in the top range of cameras currently available for general use.
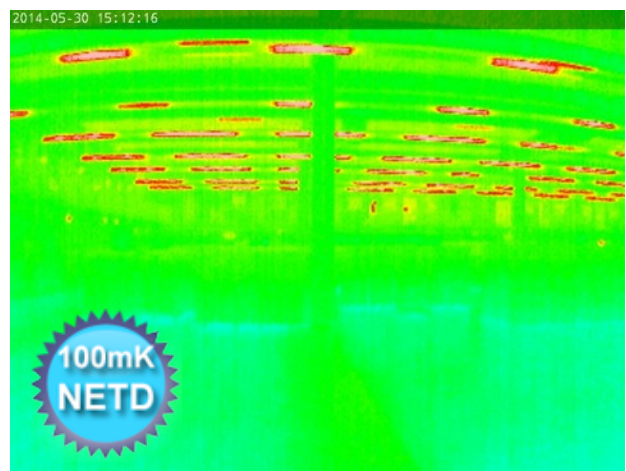
Thanks to an NETD of 50 mK, the MOBOTIX thermal image (left) shows significantly more details than a competitor's less powerful thermographic camera with an NETD of 100 mK (right).

Respecting Privacy

The detected thermal profile of a thermal camera shows no identifiable details for identification of persons and can therefore guarantee privacy. As soon as an object is moving into the relevant surveillance area, MOBOTIX dual camera system can automatically switch from thermal sensor to the optical sensor, producing visible high resolution video. This unique MOBOTIX feature combines two aspects, respecting the privacy aspect and at the same time optimal video surveillance.

Temperature Events And Thermal Overlay

Thermal radiometry (TR) cameras from MOBOTIX generate automatic alarms, defined by temperature limits or temperature ranges, which is vital to detect potential fire or heat sources. Up to 20 different temperature triggers can be defined at the same time within so-called TR (Thermal Radiometry) windows or the whole sensor image can be used over the temperature range of -40 to +550 °C. In this way critical situations can be analyzed in the control room in order to plan the next steps for effective fire prevention. Critical assets like emergency generators, wind turbines or radio stations can be cost-effectively maintained and tested remotely. MOBOTIX thermal dual camera systems offer thermal overlay to localize so-called hot spots in the visual image to prevent larger damage. The standard Power-over-Ethernet (PoE) compatibility and the extremely low power consumption of only 6 watts allows operation of MOBOTIX thermal camera systems in every situation.
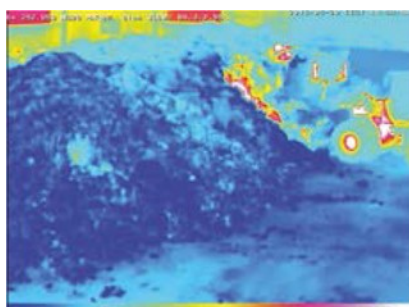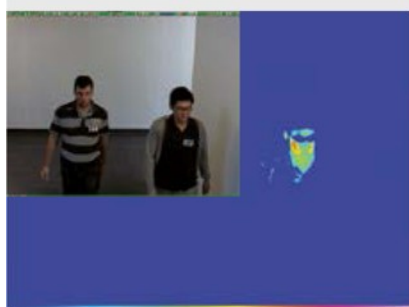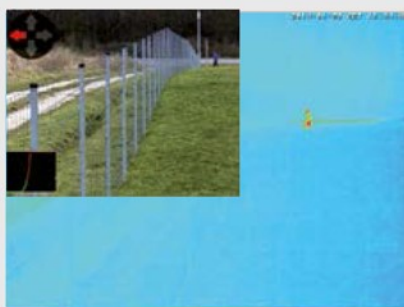

Fire prevention

No smoking area

Thermal image overlay

Border control

Perimeter protection

Privacy zones

PLEASE NOTE – Special Export Regulations For Thermographic

Cameras with thermographic image sensors ("thermographic cameras") are subject to special U.S. and ITAR (International Traffic in Arms Regulation) export regulations:

According to currently valid export regulations from the U.S. and ITAR, cameras with thermographic image sensors or their component parts cannot be exported to countries that have been embargoed by the U.S./ITAR. The corresponding delivery ban also applies to all individuals and institutions included on "The Denied Persons List" (see www.bis.doc.gov under Policy Guidance > Lists of Parties of Concern). These cameras and their installed thermographic image sensors are not to be used for the design, development, or production of nuclear, biological or chemical weapons or installed in these systems.

Link to the Thermal End User Statement on MOBOTIX Website

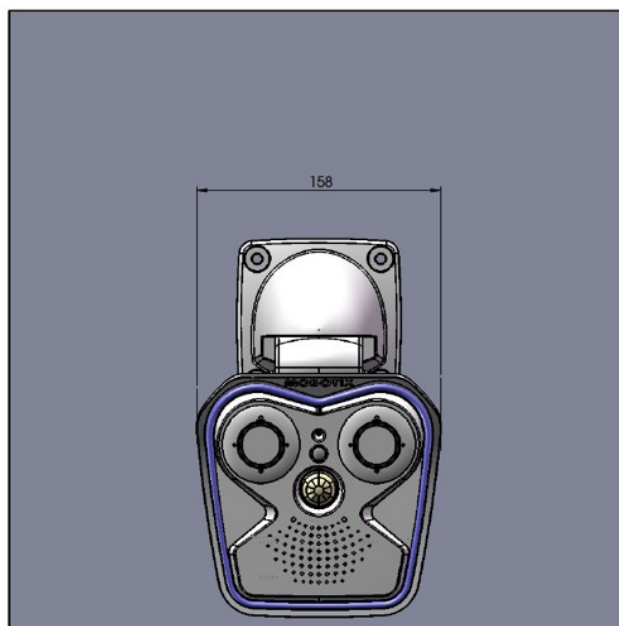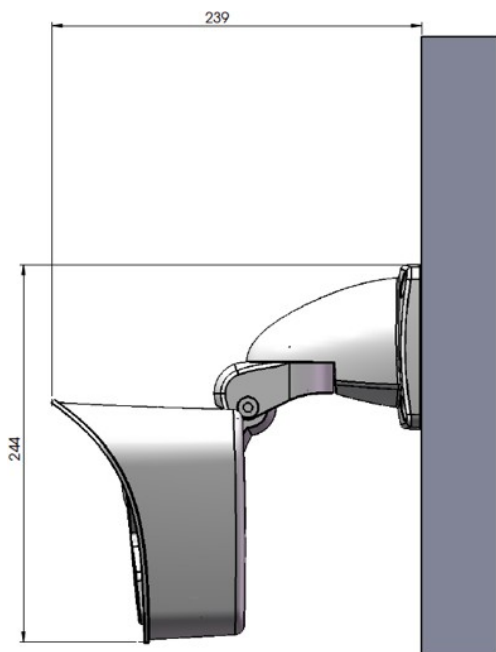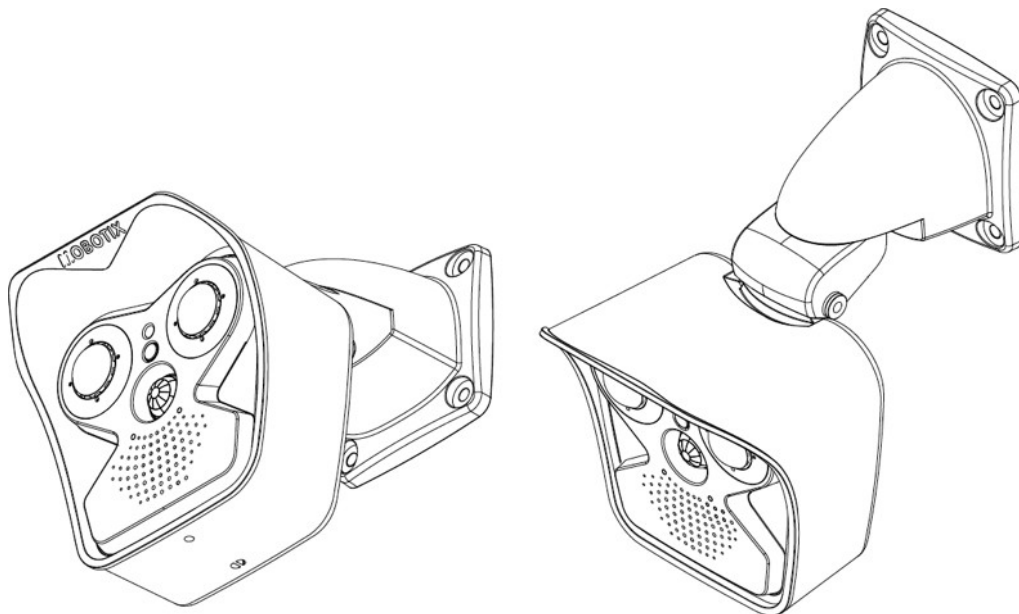MOBOTIX

Camera Variants	M16B Thermal	M16B Thermal TR
Specialties	IP Thermografic camera with/without Thermal Radiometry technology (TR) and Germanium lens; can be optionally equipped with a second optical 6MP sensor module (day/color or night/black and white to be ordered separately for easy self-assembly**)**	
Main Differences	Temperature measurement only in the center of the image (Thermal Spot, 2x2 pixels),	TR temperature measurement of each pixel in the whole image area, up to 20 independant temperature events

Thermal Lenses/Sensors, 50 mK, 336 x 252 (Factory-Assembled)	M16B Thermal	M16B Thermal TR
Thermal sensor, horiz./vert. image angle 45°/32	**Mx-M16TB-T079**	–
Thermal sensor, horiz./vert. image angle 25°/19°	**Mx-M16TB-T119**	–
Thermal sensor, horiz./vert. image angle 17°/13°	**Mx-M16TB-T237**	–
Calibrated Thermal sensor TR/Thermal Radiometry, horiz./vert. image angle 42°/32	–	**Mx-M16TB-R075**
Calibrated Thermal sensor TR/Thermal Radiometry, horiz./vert. image angle 35°/19°	–	**Mx-M16TB-R090**
Calibrated Thermal sensor TR/Thermal Radiometry, horiz./vert. image angle 17°/13°	–	**Mx-M16TB-R237**
Thermal image sensor	Uncooled microbolometer, 336 x 252 pixels, Pixel Pitch 17 µm, IR range 7,5 to 13,5 µm	
Sensitity NETD (thermal resolution)	Typ. 50 mK, < 79 mK (50 mK is equal to temperature changes of 0,05°C)	
Thermal image representation	False colors or black and white	
Temperature measuring range (adjustable)	High Sensitivity: -40 to 160°C/-40 t0 320°F – Low Sensitivity: -40 to 550°C/-40 to 1022°F	
Temperature measuring method (via camera)	In the center of the image (2x2 pixels)	Complete image areas (customizable temperature measuremnt windows)

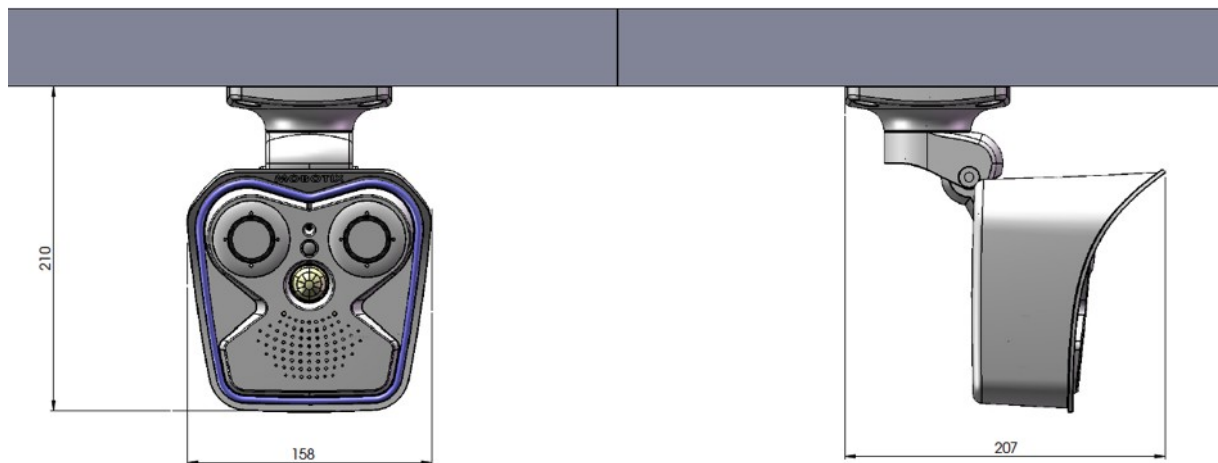| Optical Lenses/Sensors, 6MP, 3072 x 2048 (Available With Optional Sensor Module)	M16B Thermal	M16B Thermal TR
Sensor module with Fisheye Lens B016 (180° x 180°), night version optionally with long-pass filter (LPF)	Day/Color: **Mx-O-SMA-S-6D016** Night/Black&White: **Mx-O-SMA-S-6N016** LPF/Black&White **Mx-O-SMA-S-6L016**	
Sensor module with Ultra Wide Lens B036 (103° x 77°), night version optionally with LPF	Day/Color: **Mx-O-SMA-S-6D036** Night/Black&White: **Mx-O-SMA-S-6N036** LPF/Black&White: **Mx-O-SMA-S-6L036**	
Sensor module with Super Wide Lens B041 (90° x 67°), night version optionally with LPF	Day/Color: Mx-**O-SMA-S-6D041** Night/Black&White: **Mx-O-SMA-S-6N041** LPF/Black&White: **Mx-O-SMA-S-6L041**	
Sensor module with Wide Lens B061 (60° x 45°), night version optionally with LPF	Day/Color: **Mx-O-SMA-S-6D061** Night/Black&White: **Mx-O-SMA-S-6N061** LPF/Black&White: **Mx-O-SMA-S-6L061**	
Sensor module with Standard Lens B079 (45° x 34°), night version optionally with LPF	Day/Color: **Mx-O-SMA-S-6D079** Night/Black&White: **Mx-O-SMA-S-6N079** LPF/Black&White: **Mx-O-SMA-S-6L079**	
Sensor module with Tele Lens B119 (31° x 23°), night version optionally with LPF	Day/Color: **Mx-O-SMA-S-6D119** Night/Black&White: **Mx-O-SMA-S-6N119** LPF/Black&White: **Mx-O-SMA-S-6L119**	
Sensor module with Distant Tele Lens B237 (15° x 11°), night version optionally with LPF	Day/Color: **Mx-O-SMA-S-6D237** Night/Black&White: **Mx-O-SMA-S-6N237** LPF/Black&White: **Mx-O-SMA-S-6L237**	
Sensor module with Super Tele Lens B500 (8° x 6°), night version optionally with LPF	Day/Color: **Mx-O-SMA-S-6D500** Night/Black&White: **Mx-O-SMA-S-6N500** LPF/Black&White: **Mx-O-SMA-S-6L500**	
Sensor module with CS-Mount (no lens included)	Day/Color: **Mx-O-SMA-S-6DCS** Night/Black&White: **Mx-O-SMA-S-6NCS**	

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Optical Lenses/Sensors, 6MP, 3072 x 2048 (Available With Optional Sensor Module)	M16B Thermal	M16B Thermal TR
Sensor module with CSVario Lens B045-100-CS	Day/Color: **Mx-O-SMA-S-6DCSV** Night/Black&White: **Mx-O-SMA-S-6NCSV**	
Image sensor with individual exposure zones	1/1.8" CMOS, 6MP (3072 x 2048), Progressive Scan Color or Black And White	
Light sensitivity in lux at 1/60 s and 1/1 s	Color Sensor: 0,1/0,005 Black And White Sensor:0,02/0,001	

Hardware	M16B Thermal	M16B Thermal TR
Microprocessor	i.MX 6 Dual Core incl. GPU (1 GB RAM, 512 MB Flash)	
H.264 Hardware-Codec	Yes, bandwidth limitation available; output image format up to QXGA	
Protection class	IP66 and IK06; with second 6MP sensor module: IK04 with B036 to B237, IK06 with B016	
Intended use	Not for use in hazardous areas (Ex area); no mounting behind glass windows	
Ambient temperature (range, incl. storage)	-40 to 60°C/-40 to 140°F (cold boot from -30°C/-22°F)	
Internal DVR, ex works	4 GB (microSD)	
Microphone/speaker	Yes/Yes	
16bit/16kHz HD wideband audio (Opus codec)	Yes (live and audio messages)	
Passive infrared sensor (PIR)	Yes	
Temperature sensor	Yes	
Shock detector (tamper detection)	Yes	
Power consumption (typically at 20°C/68°F)	9 W (10 W possible over the short term)	
PoE class (IEEE 802.3af)	Class 2 or 3 (variable), factory setting: class 3 (required for thermal operation)	
Interfaces Ethernet 100BaseT/MxBus/USB	Yes (MxRJ45)/Yes/Yes	
Interface RS232	With accessory (MX-232-IO-Box)	
Mounting options	Wall, pole or ceiling (wall and ceiling mount included)	
Dimensions (height x width x depth)	210 x 158 x 207 mm	
Weight	1,320 g	
Housing	PBT-30GF, color: white	
Standard accessory	Screws, dowels, screw caps, 2 allen wrenches, module key, VarioFlex wall and ceiling mount with rubber sealing, 0.5 m ethernet patch cable, 1 blind module, Quick Install	
Detailed technical documentation	www.mobotix.com > Support > Download Center	
Online version of this document	www.mobotix.com > Support > Download Center	
MTBF	> 80,000 hours	
Certifications	EN55032:2012 EN55022:2010; EN55024:2010 EN61000-6-1:2007; EN 61000-6-2:2005 EN61000-6-3:2007+A1:2011 EN61000-6-4:2007+A1:2011 AS/ NZS CISPR22:2009+A1:2010 CFR47 FCC part15B	
Protocols	IPv4, IPv6, HTTP, HTTPS, FTP, FTPS, RTP, RTSP, UDP, SNMP, SMTP, DHCP (client and server), NTP (client and server), SIP (client and server) G.711 (PCMA and PCMU) and G.722	
Manufacturer's warranty (since May 2018)	3 years	

Image Formats, Frame Rates, Image Storage	M16B Thermal	M16B Thermal TR
Available video codecs	MxPEG/MJPEG/H.264	
Image formats	Freely configurable format 4:3, 8:3, 16:9 or customized format (Image Cropping), such as 2592x1944 (5MP), 2048x1536 (QXGA), 1920x1080 (Full-HD), 1280x960 (MEGA)	
Multistreaming	Yes	
Multicast stream via RTSP	Yes	
Max. image format (dual image from both sensors)	2x 6MP (6144 x 2048)	

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Technical Specifications: M16B Thermal/M16B Thermal TR

Image Formats, Frame Rates, Image Storage	M16B Thermal	M16B Thermal TR
Max. frame rate for thermal images, Thermal Overlay and dual images (thermal & optical)	9 frames per second (fps)	
Max. frame rate for optional optical 6MP sensor module (fps, only single core used)	**MxPEG:** 42@HD(1280x720), 34@Full-HD, 24@QXGA, 15@5MP, 12@6MP, 6@2x 6MP **MJPEG:** 26@HD(1280x720), 13@Full-HD, 9@QXGA, 5@5MP, 4@6MP, 2@2x 6MP **H.264:** 25@Full-HD, 20@QXGA	
Number of images with 4 GB microSD (internal DVR)	CIF: 250,000, VGA: 125,000, HD: 40,000, QXGA: 20,000, 6MP: 10,000	

General Functions	M16B Thermal	M16B Thermal TR
Temperature measurement of 2x2 pixels in the center of the image (Thermal Spot)	Yes	Yes
TR temperature measurement in the whole image area	No	Yes
Event trigger for temperatures above or below a limit between -40 to 550°C/-40 to 1022°F	Yes	Yes
Digital zoom and pan	Yes	
ONVIF compatibility	Yes (Profile S, audio support with camera firmware V5.2.x and higher)	
Genetec protocol integration	Yes	
Programmable exposure zones	Yes	
Snapshot recording (pre/post-alarm images)	Yes	
Continuous recording with audio	Yes	
Event recording with audio	Yes	
Time controlled flexible event logic	Yes	
Weekly schedules for recordings and actions	Yes	
Event video and image transfer via FTP and email	Yes	
Playback and QuadView via web browser	Yes	
Bidirectional audio in browser	Yes	
Animated logos on the image	Yes	
Master/Slave functionality	Yes	
Privacy zone scheduling	Yes	
Customized voice messages	Yes	
VoIP telephony (audio/video, alert)	Yes	
Remote alarm notification (network message)	Yes	
Programming interface (HTTP-API)	Yes	
DVR/Storage Management	Inside camera via microSD card, externally via USB device and NAS, different streams for live image and recording, MxFFS with archive function, pre-alarm an post-alarm images, monitoring recording with failure reporting	
Camera and data security	User and group management, SSL connections, IP-based access control, IEEE802.1x, intrusion detection, digital image signature	
MxMessageSystem: Sending and receiving of MxMessages	Yes	

Video Analysis	M16B Day	M16B Night	M16B Day & Night
Video motion detector		Yes	
MxActivitySensor		Yes	

Video Management Software	M16B Day	M16B Night	M16B Day & Night
MxManagementCenter		Yes	
Mobile MOBOTIX App		Yes	

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210

158

Dimensions in mm

207

17°

90°

20°

50°

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